

CH2M HILL Hanford Group, Inc.	Manual	ESHQ
FLAMMABLE/COMBUSTIBLE	Document	TFC-ESHQ-FP-STD-03, REV B-2
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	Issue Date	September 27, 2007
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### Ownership matrix

## 1.0 PURPOSE AND SCOPE

(5.1.1, 5.1.2, 5.1.3, [5.1.4](#), [5.1.5](#))

This standard describes the requirements for using, storing, and handling flammable or combustible liquids. These requirements apply to all Tank Farm Contractor (TFC) managed facilities, operations, and activities, except for the 222-S and 222-SA laboratory facilities. The laboratory facilities maintain their own procedures to implement flammable/combustible liquid safeguards and controls.

This standard does not apply to verifying that the fuel transfer equipment meets applicable U.S. Department of Transportation fuel transfer vehicle requirements. Requiring/verifying the criteria a vendor/equipment must meet is part of the procurement process. (See [TFC-BSM-CP-CPR-C-03](#) and [TFC-BSM-CP-CPR-C-05](#).)

## 2.0 IMPLEMENTATION

This standard is effective on the date shown in the header.

## 3.0 STANDARD

Users of flammable/combustible liquids shall be familiar with the liquid's hazard classification to ensure compliance with this standard. In this standard, the use of "flammable" liquids, storage cabinets, etc., is inferred to address both "flammable/combustible" liquids, storage cabinets, etc., unless stated otherwise.

### 3.1 Liquid Storage

1. In each fire area, incidental operations involving flammable/combustible liquids shall not exceed the greater of either a. or b.
  - a. One day (24 hours) operational supply

OR

  - b. The sum of 1, 2, 3, and 4:
    - 1) 95 liters (L) (25 gallons (gal)) of Class IA liquids in containers.
    - 2) 454 L (120 gal) of Class IB, IC, II, or III liquids in containers.
    - 3) 6,000 L (1,586 gal) of any combination of:
      - a) Class IB, IC, II, or IIIA liquids in metal portable tanks or metal intermediate bulk containers, each not exceeding 3,000 L (793 gal).

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- b) Class II or IIIA liquids in non-metallic intermediate bulk containers, each not exceeding 3,000 L (793 gal).
    - 4) 20 portable tanks or intermediate containers, each not exceeding 3,000 L (793 gal) of Class IIIB liquids.
  - 2. Liquids used for building maintenance, painting, or other similar infrequent purposes shall be limited to a ten day supply in closed containers.

### **3.2 Limitations for Flammable Liquid Storage Cabinets**

A single flammable liquid storage cabinet may not contain more than 454 liters (120 gal) of Class I, II, and IIIA liquids.

### **3.3 Storage Cabinets in Fire Area**

A maximum of three flammable liquid storage cabinets may be stored in a single fire area. In industrial facilities, additional cabinets (up to three groups of three in buildings without sprinkler systems, or three groups of six in buildings with sprinkler systems) may be stored in the same fire area, provided the groups of cabinets are separated by at least 30.5 meters (100 ft).

### **3.4 Storage Cabinet Vent Openings**

A flammable liquid storage cabinet's vent openings shall be sealed with properly fitted metal bungs, or if the cabinet is required to be vented, it must be vented to a safe exterior location and not compromise the integrity of the cabinet.

### **3.5 Storage Cabinets**

Flammable liquid storage cabinets shall not be placed where they could obstruct corridors, aisles, or exit doors. Liquids shall not be stored in exit enclosures (i.e., stairwells).

### **3.6 Flammable/Combustible Liquid Storage Rooms**

Flammable/combustible liquid storage exceeding the storage quantities permitted in Sections 3.1 and 3.2 of this standard shall be stored in rooms or facilities complying with National Fire Protection Association Code NFPA 30 and Occupational Safety and Health Administration Standard 29 CFR 1910.106.

### **3.7 Glass Storage Containers**

If required for liquid purity or to avoid excessive corrosion of metal containers, no more than 5 L (1.3 gal) of Class IA and IB liquids may be stored in glass containers in a fire area.

### **3.8 Approved Equipment for Dispensing Operations**

Use only nationally recognized testing laboratory listed dispensing devices.

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### 3.9 Transfer of Flammable/Combustible Liquids

1. When transferring liquids between conductive containers, the containers shall be bonded with a wire or metal-to-metal contact between the dispensing nozzle, and container/vessel shall be maintained throughout. The bonding wire or one of the containers must be grounded.
2. When transferring Class I liquids in non-laboratory areas, mechanical ventilation meeting the following criteria shall be provided.
  - Ventilation flow rate must be 0.3 m<sup>3</sup>/minute (min) for each square meter of floor area (1 ft<sup>3</sup>/min/ft<sup>2</sup>, but in no case less than 4 m<sup>3</sup>/min (150 ft<sup>3</sup>/min).
  - Intake and exhaust points must be within 300mm (12 in.) of the floor and shall be arranged to provide, as far as practicable, air movements across all portion of the floor to prevent accumulation of flammable vapors.
  - A flow monitor, or equivalent mechanism, must be provided. The device shall be equipped with an audible alarm that will sound if the ventilation system fails.

### 3.10 Fuel Transport/Storage/Transfer Within Tank Farm Boundaries

The purpose of these controls and compensatory measures is to mitigate the change of a fire within the tank farm boundaries that could be initiated by the storage, transport, or transfer of flammable/ combustible liquids/fuels. Vehicles and equipment are fueled outside of tank farms whenever practical. Within the tank farm boundaries:

1. The transport of flammable/combustible liquid fuel via vehicle is prohibited.
2. The use of portable fuel canisters in quantities greater than five gallons is prohibited.
3. Storage of flammable/combustible liquid fuel is prohibited.
 

NOTE: Fuel contained within the fuel tanks of authorized fuel-powered vehicles and equipment is not considered storage and is excluded from the requirements of this procedure.
4. Five gallons or less of “in-use” flammable/combustible liquids” ARE ALLOWED at an active work site for refueling equipment. The fuel shall be in a nationally recognized testing laboratory-listed portable container.
5. The transfer of flammable/combustible liquid fuel from a fuel tanker via pressurized fuel line IS ALLOWED in accordance with the following:
  - The fuel tanker shall remain outside of the tank farm boundaries.
  - The pressurized fuel line (limited to one at a time) shall not traverse open risers or cover blocks.
  - The fuel transfer activity shall be physically manned with an attendant located at the fuel tanker distribution point AND an attendant at the receiving vessel fuel

receiving point. Constant communication shall be maintained between the attendants during fuel transfers.

- The receiving vehicle/equipment and the fuel line/dispenser shall maintain metal-to-metal contact or use a bonding wire/strap during fuel transfer. This will preclude the buildup of a static charge and mitigate the chance of a spark being generated.
- If the vehicle/equipment does not require continuous operation, the motor(s) of the vehicle/equipment shall be shut off during the refueling process.
- The applicable Department of Transportation (DOT) codes and regulations applying to fuel tankers are outside the scope of this procedure (see Section 1.0.).

6. The transport/transfer of flammable/combustible liquid fuel within the tank farm boundaries via portable fuel canister IS ALLOWED in accordance with the following:

- Portable fuel containers shall not traverse open risers or cover blocks.
- If the vehicle/equipment does not require continuous operation, the motor(s) of the vehicle/equipment shall be shut off during the refueling process.
- The portable fuel canisters used for refueling purposes shall be certified by a nationally recognized testing laboratory.
- The receiving vehicle or equipment shall be bonded with the portable fuel canister to preclude the occurrence of sparks during the fuel transfer.

### 3.11 Tank Farm Boundary Vehicle Access Requirements

Vehicle access within tank farm boundaries shall be limited to vehicles whose fuel systems are protected from damage to the integrity of the fuel systems caused by potential collisions with tank structures. Shift Operations shall ensure that each vehicle entering a tank farm boundary meets one of the following criteria and safeguards are implemented in accordance with TFC-OPS-OPER-C-10.

- The vehicle's fuel system components are protected from contacting aboveground tank structures from both the front and the rear (e.g., by the vehicle's front and rear axles, bumpers, chassis cross members, rear differential housings, etc.). ~~or~~ Additionally, fuel tanks mounted external to chassis cross member will have no part extending beyond the widest part of the vehicle.

OR

- The vehicle is equipped with a skid plate or engineered side guard to protect the fuel system.

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### 3.11.1 Tank Farm Boundaries Outside Fenced Area

The controlling organization for each tank farm shall maintain physical barriers (i.e., chain-linked fencing, metal interlocking rail systems, concrete or concrete filled piping posts, concrete barriers, T-posts connected with a chain, etc.) outside the tank farm fenced area to restrict vehicle access in the vicinity of aboveground waste tank structures.

NOTE: Authorized vehicles ARE allowed entry within the physical barrier areas.

### 3.11.2 Physical Barrier Surveillance

Periodic surveillance shall be performed and documented by Shift Operations, or designee, to verify that the physical barriers are being maintained. An annual surveillance is required, but Shift Operations may determine more frequent surveillance intervals on a case-by-case basis, as necessary.

### 3.12 Handling Combustible Solid Waste and Residue

Combustible solid waste and residue from handling flammable/combustible liquids shall be stored in approved, closed, metal containers, and shall be disposed of daily. This requirement does not apply to new or unused materials.

### 3.13 Outdoor Storage Requirements

Requirements for outdoor storage of flammable/combustible liquid are specified in NFPA 30 and 29 CFR 1910.106. Call the TFC fire protection engineer for assistance with these requirements.

## 4.0 DEFINITIONS

Bonding. The process of connecting two or more conductive objects together by means of a conductor (e.g., wire, strap, etc.). Bonding eliminates the potential difference between conductive objects. No other bonding is necessary with metal-to-metal contact between dispensing nozzle and container/equipment/vehicle. When wire is used for dissipating static electricity, the currents are quite small and the minimum size wire is adequate to carry the current. Stranded or braided wire should be used for bonding wire that will be connected and disconnected frequently. Uninsulated wire is recommended for bonding because it is easier to detect defects, but insulated wire is also acceptable if closely inspected before use. The connection can be made using bolts, pressure-type ground clamps, battery clamps, magnets, brazing, welding, etc., as long as there is good metal-to-metal contact.

Combustible liquids. Liquids with flash points at or above 37.8°C (100°F). Combustible liquids are subdivided as follows:

- Class II liquids have flash points at or above 37.8°C (100°F) but below 60°C (140°F)
- Class IIIA liquids have flash points at or above 60°C (140°F) but below 93°C (200°F)
- Class IIIB liquids have flash points at or above 93°C (200°F).

Flammable liquids. Liquids with flash points below 37.8°C (100°F) with a vapor pressure not exceeding 276 Kpa absolute (40 lb/in<sup>2</sup>) (2068 mm Hg) at 37.8°C (100°F) are called Class I liquids. Class I liquids are subdivided as follows:

- Class IA liquids have flash points below 22.8°C (73°F) and boiling points below 37.8°C (100°F).
- Class IB liquids have flash points below 22.8°C (73°F) and boiling points at or above 37.8°C (100°F).
- Class IC liquids have flash points at or above 22.8°C (73°F) but below 37.8°C (100°F).

Grounding. The process of connecting one or more conductive objects to the earth and is a specific form of bonding. Grounding eliminates the potential differences between objects and the earth. When wire is used for dissipating static electricity, the currents are quite small and the minimum size wire is adequate to carry the current. Stranded or braided wires should be used for bonding wires that will be connected and disconnect frequently. Uninsulated wire is recommended for bonding because it is easier to detect defects, but insulated wire is also acceptable if closely inspected before use. The connection can be made using bolts, pressure-type ground clamps, battery clamps, magnets, brazing, welding, etc., as long as there is good metal-to-metal contact.

In-use. Equipment that is continuously operating/running or that is intermittently used within a 24-hour period.

Process area. In an “industrial occupancy,” it is the section of the building that a process or manufacturing task takes place. The term applies to an industrial occupancy only.

Staged/stored fuel. Fuel at the work site for refueling equipment that is in-use is “staged” fuel. If the equipment is not used within a 24-hour period, the fuel that was staged for in-use purposes is considered “stored” fuel.

Tank farm boundaries. The fenced tank farm boundary areas and areas outside the tank farm fenced boundary areas for which physical barriers (e.g., chain link fencing, metal interlocking rail systems, concrete filled piping posts, concrete barriers, T-posts connected with chain, etc.) have been maintained to restrict vehicle access in the vicinity of aboveground waste tank structures.

## 5.0 SOURCES

### 5.1 Requirements

1. [10 CFR 851, “Worker Safety and Health Program.”](#)
2. [DOE O 420.1A](#), “Facility Safety.” (S/RID)
3. [ORP M 420.1-1](#), “ORP Fire Protection Program.” (S/RID)
4. [RPP-13033](#), “Tank Farms Documented Safety Analysis.”

5. [29 CFR 1910.106, "OSHA General Industry Regulations," "Flammable and Combustible Liquids."](#)

## 5.2 References

- ~~1. 29 CFR 1910.106, "OSHA General Industry Regulations," "Flammable and Combustible Liquids."~~

1. NFPA 30, "Flammable and Combustible Liquids Code."

- ~~3. TFC-BSM-CP-CPR-C-03, "Buyer's Technical Representative Process."~~

2. TFC-BSM-CP-CPR-C-05, "Procurement of Services."

- ~~4.3. [TFC-OPS-OPER-C-10, "Vehicle and Dome Load Control in Tank Farm Facilities."](#)~~